US 20090039282A1

(19) **United States**

(12) **Patent Application Publication**

**Haase et al.**

(10) **Pub. No.: US 2009/0039282 A1**

(43) **Pub. Date: Feb. 12, 2009**

(54) **MATRIX-ASSISTED LASER DESORPTION WITH HIGH IONIZATION YIELD**

(75) Inventors: **Andreas Haase**, Bremen (DE); **Jens Hohndorf**, Bremen (DE)

Correspondence Address:
**LAW OFFICES OF PAUL E. KUDIRKA**
**40 BROAD STREET, SUITE 300**
**BOSTON, MA 02109 (US)**

(73) Assignee: **BRUKER DALTONIK GMBH**, Bremen (DE)

(21) Appl. No.: **12/177,434**

(22) Filed: **Jul. 22, 2008**

(30) **Foreign Application Priority Data**

Jul. 31, 2007 (DE) ..... 10 2007 035 826.3
Sep. 12, 2007 (DE) ..... 10 2007 043 456.3

**Publication Classification**

(51) **Int. Cl.**
***H01J 27/02*** (2006.01)
***B01D 59/44*** (2006.01)

(52) **U.S. Cl.** ..... **250/423 R**; 250/489; 250/282

(57) **ABSTRACT**

Analyte ions are generated in an ion source by matrix-assisted laser desorption (MALDI) in which laser light pulses have significantly less than one nanosecond duration, focal diameters of less than twenty micrometers and energy densities such that only about one picogram of sample is desorbed per pulse of laser light and per laser spot. An unexpectedly high degree of ionization of analyte molecules is produced for selected matrix substances. Many laser spots can be generated side-by-side from a single laser light pulse for use with MALDI time-of-flight mass spectrometers. Applying pulses with a repetition rate of around 50 kilohertz and moving the sample or guiding the laser light beam so each laser light pulse impinges on a cool sample spot allows the ion source to be used with spectrometers that require a constant ion current.